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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/749,493

12/31/2003

Pak-Lung Seto

42P17717

1215

8791 7590 01/10/2007
BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

EXAMINER

LEE, CHUN KUAN

ART UNIT

PAPER NUMBER

2181

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/10/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/749,493	Applicant(s) SETO, PAK-LUNG	
	Examiner Chun-Kuan (Mike) Lee	Art Unit 2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,12-16,18-21 and 23-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-10,12-16,18-21 and 23-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

Fitzmaurice
11/6/2006
FITZ FLEMING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/20/2006 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 3-10, 12-16, 18-21 and 23-28 have been considered but are moot in view of the new ground(s) of rejection. Objection of claim 6 due to informalities is withdrawn. Currently, claims 2, 11, 17 and 22 are canceled and claims 1, 3-10, 12-16, 18-21 and 23-28 are pending for examination.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2181

3. Claims 1, 3, 6, 9, 12, 14-15, 19-20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US Patent 6,915,363) in view of Brewer et al. (US Patent 6,886,057) and further in view of Kahn et al. (US Patent 6,636,909).

4. As per claims 1, 9, 15 and 20, Wood teaches an apparatus, a system, a method and an article comprising:

at least one storage protocol controller (system controller 314 of Fig. 3) capable of communicating in accordance with a plurality of storage protocols (e.g. Serial ATA, ATA/IDE, SCSI, USB, IEEE-1394 (Firewire), Fiber Channel and iSCSI) (col. 6, ll. 12-18 and col. 7, ll. 15-19), the at least one storage protocol controller capable of being coupled with a bus (Fig. 3, ref. 312);

a storage enclosure including a plurality of storage devices (Fig. 3, ref. 318, 330, 338, 342, 346, 350, 354), wherein two or more of the storage are combined in a Redundant Array of Inexpensive Disk (RAID) configuration (col. 1, ll. 26-60), and each storage is capable of communicating in accordance with one of Serial Attached SCSI (SAS), Serial Advance Technology Attachment (SATA) and Fiber Channel (FC) storage protocol (col. 6, ll. 12-18 and col. 7, ll. 15-19);

an intermediate device (Fig. 1, ref. 316, 324, 326) coupled between the storage protocol controller and at least one of the plurality of storage devices, and capable of communicating in accordance with a plurality of storage protocols (col. 7, ll. 15-19); and

an appropriate hardware, software, firmware, logic and programming to be utilized for the operation of the system (col. 6, ll. 55-65), wherein the software, firmware and programming would have been stored in a storage medium to be executed.

Wood does not teach the system, the method, the article and the apparatus comprising wherein the interface device including:

protocol sensing circuitry to determine base on an initialization signal sequence indicative of a storage protocol received from the at least one storage device which one of the plurality of storage protocols is associated with the at least one storage device; and

flow control circuitry to control a data stream between the at least one storage device and the storage protocol controller in accordance with the one storage protocol, wherein the data stream includes the storage protocol determined by the protocol sensing circuitry.

Brewer teaches a system and a method comprising:

a protocol selector (Fig. 1, ref. 28 and Fig. 2, ref. 34) coupled to a peripheral (Fig. 1, ref. 26) through a universal protocol socket (Fig. 2, ref. 48) having a universal form factor for plural protocols by supporting different protocols over a single bus (col. 4, ll. 44-46 and col. 6, ll. 26-28);

the universal protocol socket's protocol identification unit (Fig. 2, ref. 58) receiving a signal (i.e. initialization signal sequence) to determine the type of protocol is utilized by the peripheral for communication (col. 5, l. 66 to col. 6, l. 14), wherein the

protocol identification unit determines the type of communication protocol to select and use based on the received signal from the peripheral;

the universal protocol socket communicating the type of protocol detected over the protocol selection line (Fig 2, ref. 60) in order to selected at least one of a plurality of communication protocols based on the received signal from the peripheral (col. 5, ll. 25-29 and col. 5, l. 66 to col. 6, l. 14).

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Brewer's protocol selector and universal protocol socket into Wood's interface device. The resulting combination of the references further teaches the system, the method, the article and the apparatus comprising wherein the interface device further including the protocol selector and the universal protocol socket for determining, based on the signal (i.e. initialization signal sequence) received from the at least one storage device, the storage protocol among the plurality of storage protocols that is utilized by the corresponding storage device.

Therefore, it would have been obvious to combine Brewer with Wood for the benefit of combining multiple busses on one set of wire lines with the universal form factor supporting multiple bus protocols (Brewer, col. 2, ll. 32-37).

Kahn teaches a flow control system and method comprising:

a computer (Fig. 1, ref. 100) coupled to a storage device (Fig. 1, ref. 110), wherein the storage device includes an internal queue (col. 2, l. 10); and

the computer sending a write command to the storage device when the storage device's internal queue is full, in response, the storage device signals the computer regarding the full condition (col. 2, ll. 29-51).

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Kahn's flow control into Wood and Brewer's interface device. The resulting combination of the references further teaches the system, the method, the article and the apparatus comprising wherein the interface device further including the flow control circuitry such as informing the storage protocol controller regarding the full condition resulted from the at least one storage device's internal queue is full, so that the storage protocol controller may inform the computer to temporary suspend the transferring of commands to the at least one storage device, wherein the flow control must function in accordance with the communication protocol that was determined by the protocol sensing circuitry.

Therefore, it would have been obvious to combine Kahn with Wood and Brewer for the benefit of preventing the dropping of commands by the storage device, as the storage device's internal queue is almost full (Kahn, col. 2, l. 67 to col. 3, l. 3).

5. As per claims 3 and 12, Wood, Brewer and Kahn teach all the limitations of claims 1 and 9 as discussed above, where Wood further teaches the system and the apparatus comprising wherein the predetermined signal sequence comprises an out-of-band signal sequence (Wood, Fig. 3, ref. 325 and col. 7, 59-62).

6. As per claims 6 and 14, Wood, Brewer and Kahn teach all the limitations of claims 1 and 9 as discussed above, where Wood further teaches the system and the apparatus comprising wherein the plurality of different storage protocols comprise a Fiber Channel protocol, a Serial Attached Small Computer System Interface protocol, and a Serial Advanced Technology Attachment protocol (Wood, col. 6, ll. 12-18 and col. 7, ll. 15-19).

7. As per claims 19 and 24, Wood, Brewer and Kahn teach all the limitations of claims 15 and 20 as discussed above, where Brewer further teaches the system and the apparatus comprising communicating, by the intermediate device with said at least one storage device with a selected storage protocol among the plurality of storage protocols (col. 5, l. 25 to col. 6, l. 14), as the intermediate device would determine and select among the plurality of communication protocols the corresponding communication protocol utilized by the storage device, and then transfer data in accordance to the selected communication protocol.

8. Claims 4, 13, 16 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US Patent 6,915,363), Brewer et al. (US Patent 6,886,057) and Kahn et al. (US Patent 6,636,909), and further in view of Wong et al. (US Pub.: 2003/0035504).

Wood, Brewer and Kahn teach all the limitations of claims 1, 9, 15 and 20 as discussed above, where Wood, Brewer and Kahn further teach the system, the method, the article and the apparatus comprising wherein:

the protocol sensing circuitry is also capable of receiving at least one of an out-of-band signal sequence (Wood, Fig. 3, ref. 325 and col. 7, 59-62) and an analog burst signal sequence (Brewer, col. 5, l. 22 to col. 6, l. 14); and

the flow control circuitry capable of receiving a data stream from said at least one storage device and transfer to the storage protocol controller (Brewer, col. 5, l. 22 to col. 6, l. 14 and Kahn, col. 2, ll. 29-51), as the regulation of data transferring is associated with the selected communication protocol.

Wood, Brewer and Kahn does not teach the system, the method, the article and the apparatus comprising wherein:

the intermediate device having the flow control circuitry comprises data tracking circuitry capable of generating a clock signal indicative of the frequency of said data stream, and said flow control circuitry also comprising retimer circuitry capable of receiving said data stream and said clock signal and generating a retimed data stream; and

transmitting the retimed data stream to at least one of the at least one storage protocol controller and the at least one of said plurality of storage device.

Wong teaches a system and a method comprising a retimer including a clock and data recovery (CDR) circuit configured to recovery a clock from a received data stream and reclock the data ([0016]).

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Wong's retimer and CDR into Wood, Brewer and Kahn's interface device. The resulting combination of the references teaches the system, the method, the article and the apparatus comprising wherein:

the intermediate device including the retimer having the CDR for recovering the clock from the received data stream and reclock the data;

as the CDR recovers (i.e. generate) the clock frequency from the receiving data stream and the associated clock signal, wherein the recovered clock frequency would be indicative of the frequency of the received data stream, and

reclocks the data stream (i.e. retimed data stream), which would be transferred to at least one of the at least one storage protocol controller and the at least one of said plurality of storage device.

Therefore, it would have been obvious to combine Wong with Wood, Brewer and Kahn for the benefit of transmitting a cleaner data stream by utilizing a clean retimer clock free from jitter (noise) (Wong, Abstract; [0009]-[0010] and [0017]).

9. Claims 5, 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US Patent 6,915,363), Brewer et al. (US Patent 6,886,057) and Kahn et al. (US Patent 6,636,909), and further in view of "Parallel vs. Serial ATA".

Wood, Brewer and Kahn teach all the limitations of claims 1 and 9 as discussed above, where Wood and Brewer further teach the system and the apparatus comprising:

the intermediate device (Wood, Fig. 3, ref. 316, 324, 326) is capable of being coupled to said storage protocol controller (Wood, Fig. 3, ref. 314) and said at least one of the plurality of storage devices (Wood, Fig. 3, ref. 316, 330, 338, 342, 346, 350, 354), and communicate utilizing at least one of said storage protocols (Wood, col. 6, l. 12-18; col. 7, ll. 15-19 and Brewer, col. 5, l. 25 to col. 6, l. 14).

Wood, Brewer and Kahn does not expressly teach the system and the apparatus comprising the utilizing of at least one cable to coupled the intermediate device to the at least one storage devices and to the storage protocol controller, wherein the cable is compatible with at least one of the plurality of storage protocols.

Parallel vs. Serial ATA teaches a system and a method comprising a cable (bus) coupling the hard drive to the motherboard, wherein the cable is compatible with the storage protocol utilized by the hard drive (Fig. 2 on page 3 and Fig. 5-6 on page 5).

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Parallel vs. Serial ATA's cable into Wood, Brewer and Kahn's system and apparatus. The resulting combination of the references teaches the system and the apparatus comprising the intermediate device couple to the storage protocol controller and the storage device utilizing one or more cables, wherein the cable would conform to the storage protocol utilized by the storage device.

Therefore, it would have been obvious to combine Parallel vs. Serial ATA with Wood, Brewer and Kahn because it is well known to one skilled in the art regarding the use of the cables to interconnect hardware devices within the computer system in order to enable proper transferring of data between the hardware devices.

10. Claim 8 and 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US Patent 6,915,363), Brewer et al. (US Patent 6,886,057) and Kahn et al. (US Patent 6,636,909), and further in view of "Fiber Channel Tutorial".

Wood, Brewer and Kahn teach all the limitations of claim 1 as discussed above, where Wood, Brewer and Kahn further teach the apparatus comprising wherein the intermediate device further comprises protocol control circuitry (Brewer, protocol identification unit 58 of Fig. 2) capable of receiving a signal (e.g. source data stream) from said at least one storage device (Brewer, col. 5, l. 6 to col. 6, l. 14);

wherein the received signal conforms to the Fiber Channel protocol (Wood, col. 6, ll. 12-18 and col. 7, ll. 15-19); and

wherein the flow control is configured to transmit a hold request (e.g. queue full condition) to the storage protocol controller in response to receiving a hold request from one of the storage devices indicating that a receive buffer (e.g. internal queue) of the one of the storage devices is filled above a threshold level (i.e. full or almost full) (Kahn, col. 2, l. 10 and col. 2, ll. 29-51).

Wood, Brewer and Kahn does not expressly teach the apparatus comprising the intermediate device generating an acknowledge signal to be transmitted to said at least one storage device in response to the received signal (hold request).

Fiber Channel Tutorial teaches the system and method comprising when destination receives a frame (e.g. signal), an ACK frame (i.e. acknowledge signal) is returned to the source (Flow Control Section on page 9).

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Fiber Channel Tutorial's ACK frame into Wood, Brewer and Kahn's apparatus. The resulting combination of the references teaches the apparatus comprising the intermediate device generating the ACK frame in response to the received signal from the at least one storage device.

Therefore, it would have been obvious to combine Fiber Channel Tutorial with Wood, Brewer and Kahn because Wood, Brewer and Kahn's apparatus utilized the Fiber Channel protocol for communication, therefore Wood, Brewer and Kahn's apparatus must conforms to the standard utilized by the Fiber Channel protocol.

11. Claims 18 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US Patent 6,915,363), Brewer et al. (US Patent 6,886,057) and Kahn et al. (US Patent 6,636,909), and further in view of Wong et al. (US Pub.: 2003/0035504).

Wood, Brewer and Kahn teach all the limitations of claim 15 and 20 as discussed above.

Wood, Brewer and Kahn does not teach the method and the article further comprising:

determining, by the intermediate device, a link frequency associated with said at least one storage device; and

communicating, by said intermediate device with said at least one storage device using said link frequency.

Wong teaches a system and a method comprising a retimer including a clock and data recovery (CDR) circuit configured to recovery a clock from a received data stream and reclock the data ([0016]), wherein a phase lock loop (PLL) system is implemented to lock the transmit clock to the recover clock ([0034]).

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Wong's retimer, CDR and the PLL system into Wood, Brewer and Kahn's interface device. The resulting combination of the references teaches the method and the article further comprising the PLL system determining the link frequency associated with the at least one storage device, as the PLL locks on to frequency of incoming data stream, and transferring the data stream in accordance to the determined link frequency.

Therefore, it would have been obvious to combine Wong and Wood, Brewer and Kahn for reason stated above in claims 4, 13, 16 and 21.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chun-Kuan (Mike) Lee whose telephone number is (571) 272-0671. The examiner can normally be reached on 8AM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fritz M. Fleming can be reached on (571) 272-4145. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C.K.L.
01/05/2007


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1/8/2007